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ABSTRACTS

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Tuberculosis in Denmark.—Denmark had the lowest tuberculosis mortality rate prior to World War II—34 for 100,000, and there has been no essential change since then. One of the most important factors for this favorable situation is seen in the fact that in Denmark the *"ideal state has been approached where few have too much and fewer not enough."* Social legislation, since 1933, provides that every person over 14 years of age belong to a sick-benefit club through which "free medical advice, free hospitalization and, in part, free medicine are obtainable." It also "provides for every old person, for everybody who has become incapable of work from illness or invalidity, and for the unemployed." Denmark has now one tuberculosis bed for each 1,000 inhabitants or 3.9 for each annual death from pulmonary tuberculosis. Every county has a relatively independent control unit for tuberculosis with well organized central integration for the country as a whole—each taking care of about 100,000 to 200,000 persons. These units do not only act as control centres, but they also have extensive social-service activities. The usual surveys are made, including an increasing number under the auspices of "many large organizations." In addition to the extensive use of tuberculin tests—all done with PPD supplied as a standard preparation from the State Serum Institute—particular stress is put on bacteriological examinations. All cultures are done in the State Serum Institute, where, in 1943-1944, 26,571 specimens were received for this purpose. All specimens are cultured, even if smears are positive. Nearly 5,000 sputa yielded positive cultures, representing 18.8 per cent of all cultured sputa. Of 24,416 sputa negative on smear, 2,889 were found positive on culture, that is nearly 60 per cent of the total positive sputum cultures. Gastric lavage specimens cultured have increased from 9,542 in 1941 to 20,898 in 1945 and sputa from 4,905 to 20,269 during the same period. Gastric lavage specimens are required routine in all formerly positive persons for a minimum of three years of completely negative specimens. A unified code for classification of pulmonary tuberculosis is accepted in which bacillary findings, expectoration and X-ray aspects are the criteria. With such all-embracing control measures, it may be astonishing that of all newly reported cases in the years 1941 to 1944, inclusive, 79.6 per cent had positive bacillary findings and 20.6 per cent had cavities. Since 1930, when active measures were started, tuberculosis in cattle has much decreased. In 1937, 73.5 per cent of all herds contained tuberculin reactors, in 1945, only 8.9 per cent. From the fact that human tuberculosis caused by the bovine tubercle bacillus has similarly declined (although spread from man to man should, theoretically, have maintained a larger number of such infections in man) the conclusion is reached "that the type characters of the tubercle bacilli are not constant." And: "After staying in the human organism for some time, the bovine type of the tubercle bacilli will change in character in such a way as to be diagnosed as the human type." In pulmonary tuberculosis the bovine type was found in from 2.9 to 5.6 per cent (depending on the nature of specimen: sputa, gastric contents, pleural effusions), while in extra-

pulmonary tuberculosis it was identified in from 13.2 to 34.2 per cent, depending on the localization of the disease, being most frequent in cervical lymph nodes and rarest in spinal fluids. The relative frequency of bovine infections decrease with increasing age. Tuberculin reactors in first-year school children decreased from 18.1 (boys) and 16.6 (girls) per cent in 1937/38 to 6.9 and 5.6 per cent, respectively, in 1944/45. The annual increment in tuberculin reactors among school children is between 2.7 and 10.2 per cent in different parts of the country, and the annual "reversion rate" (i. e. those losing their tuberculin skin sensitivity) is between 0.2 and 3.6 per cent. With a low rate of primary infections in childhood primary infections are relatively frequent in young adults, a relatively large percentage developing directly into progressive pulmonary tuberculosis (called "genuine tuberculosis"). It seems to be the impression that treatment of primary infiltrations is useless and that therapy should not start until "genuine tuberculosis" is manifest. Reasons and sources for newly reported cases were (in 1944): 74.0 per cent asked for examination because of symptoms; contact examinations, 10.3 per cent; group examinations, 5.1 per cent. The latter type of examinations yields about one previously unrecognized infectious case of pulmonary tuberculosis in 500 persons examined. At present, BCG vaccination is advised for all tuberculin-negative persons above the age of 7 or 8. Few persons decline to accept this advice.—*Tuberculosis Control in Denmark, J. Holmes, Pub. Health Rep., October 4, 1946, 61: 1426.*—(*M. Pinner*)

Global Distribution of Tuberculosis.—The available prewar data on the prevalence of tuberculosis throughout the world are presented in tables and geographic maps, unsuitable for brief abstracting. It is estimated that particularly high prevalences exist in Eastern Europe and Asia, in Alaska, Greenland, Newfoundland and Labrador, and also in Latin America. High figures are reported for North Africa.—*Tuberculosis throughout the World, Sarah E. Yelton, Pub. Health Rep., August 2, 1946, 61: 1144.*—(*M. Pinner*)

Tuberculosis Control Division.—A brief review is presented of the activities of the Tuberculosis Control Division of the United Public Health Service, with particular emphasis on the work of field demonstrations and the program of grants-in-aid. This Division started to operate in July, 1944; State Aid, Radiology and Field Studies Sections were organized. During the first year, training courses for 35 medical officers, and 5 additional men from foreign countries, were arranged; photofluorographic operators were trained; demonstrations of case-finding techniques were held; and small film units with the necessary personnel were loaned to states. Since the inception of these activities in 1944, over one million persons were examined; 1.2 per cent had reinfection tuberculosis. Demonstration programs are usually continued by the states. A coöperative program is being developed for the purpose of radiographic examination of all patients admitted to hospitals, since it has been shown by previous workers that the hospital population is a fertile ground for case-finding. The first grants that were secured from Congress were used for the establishment of health department services for case-finding in the form of mass chest X-ray surveys. In July, 1944, there was a total of 21 full-time tuberculosis control officers in the states; fifteen months later, the number was 40. About 300 X-ray units have been secured or ordered. Consultation services, basic research and various coöperative projects are being developed.—*Review of Tuberculosis Control Demonstrations and the Program of Grants-in-Aid, F. J. Weber, Pub. Health Rep., May 3, 1946, 61: 643.*—(*M. Pinner*)

Heart Disease.—Of all deaths that occurred in the U.S.A. in 1944, 30 per cent were due to heart disease. The yearly deaths caused by heart disease increased by 38 per cent since 1934, while tuberculosis deaths decreased by 24 per cent during the same

decade. But tuberculosis is still a most important cause of deaths in the age group of 15 to 44, causing nearly as many deaths in this age group as cardiac disease. From the point of view of public health, it is important that tuberculosis is more truly preventable than is heart disease.—*Editorial: Heart Disease and Tuberculosis, (unsigned), Pub. Health Rep., October 4, 1946, 61: 1425.—(M. Pinner)*

Beds for Tuberculosis.—In 1944, 36 per cent of all deaths from respiratory tuberculosis in the United States occurred outside of hospitals. The need for more beds is particularly urgent in the South where nine states have from 55 to 77 per cent tuberculosis deaths occurring outside institutions. The total addditional need for beds is estimated at some 44,000.—*Editorial: Need for Hospital, Facilities for the Tuberculous, (unsigned), Pub. Health Rep., August 2, 1946, 61: 1131.—(M. Pinner)*

Tuberculosis Mortality, U. S. A. 1944.—This is a detailed statistical study of tuberculosis mortality for the year 1944 for the entire United States and for each single state. Rates are presented according to sex, race and age. Comparisons between the periods 1939–1941 and 1942–1944 are shown. Available data for veterans of World War I and II are presented. Figures for hospitalization at time of death are given separately for civilians and veterans. [It is impossible to prepare a proper abstract of this paper—beyond mentioning what it contains—because it has itself the conciseness of an abstract.]—*Tuberculosis Mortality in the United States and in Each State: 1944, J. Yerushalmy & I. M. Moriyama, Pub. Heath Rep., April 5, 1946, 61: 487.— (M. Pinner)*

Tuberculosis Mortality in Cities.—In the two-year period 1942–1943, tuberculosis accounted for 4.6 per cent of all deaths in American cities of 100,000 or more inhabitants and for 4.0 and 3.6 per cent, respectively, in rural areas and smaller urban places. Within the large cities, the proportion of deaths varied from less than 2 per cent to nearly 10 per cent. A statistical analysis of tuberculosis deaths in the 92 cities of 100,000 or more population is presented. The death ratios for 1939 to 1941 and for 1942–1943 are tabulated with the percentage changes between the two periods; separate tables are given for "all races," for white and for nonwhite. Four other tables present these data broken down according to size of cities; and finally these findings are grouped according to geographical regions.—*Tuberculosis Mortality in Major Cities: United States, 1942–1943, R. V. Kasius & E. H. Pitney, Pub. Health Rep., March 1, 61: 297.—(M. Pinner)*

Tuberculosis in Major Cities.—Significant data are presented in tables and graphs, unsuitable for abstracting. Data comprise death ratios according to sex, race and age groups; tabulations of death ratios for 92 cities for 1942–1944, for 1944 and for 1942–1943; of death ratios for the nonwhite population for 40 cities; number and per cent of deaths from respiratory tuberculosis, in institutions; *idem*, by race and sex; and number of deaths from all forms of tuberculosis, by race (by place of residence) in 92 cities of over 100,000. As usual, San Antonio ranks highest in all but alphabetical listings.—*Tuberculosis Mortality in Major Cities: United States, 1944, Elizabeth H. Pitney & R. V. Kasius, Pub. Health Rep., October 4, 1946, 61: 1443.—(M. Pinner)*

Tuberculosis Mortality in Nonwhites.—A declining mortality rate from a preventable disease indicates satisfactory progress only if it can be shown that the decrease is faster than that of the general mortality rate. The proportionate mortality or death ratios express the number of deaths from a specific cause in percentage of all deaths; this index is, therefore, an indication of the decrease of mortality from a specific cause, independent of the conditions that may cause a concomitant drop in total mortality. According to this criterion, the decline in tuberculosis mortality has been satisfactory during the

last few decades for all groups of our population with the exception of nonwhite males and females in the age groups 15 to 34 years. For these latter groups an increase in death ratios started around 1938. It is demonstrated that only part of this increase was caused by a particularly rapid drop in the mortality rates for other statistically important causes of death in this age group. Further analysis shows that nonwhite females fared worse than males.—*The Increase in Tuberculosis Proportionate Mortality among Nonwhite Young Adults, J. Yerushalmy, Pub. Health Rep., February 22, 1946, 61: 251.—(M. Pinner)*

Photoroentgenography in Tuberculosis Prophylaxis.—The photoroentgenographic method has fundamentally changed the outlook in tuberculosis prophylaxis. Its use has permitted systematic and periodic mass surveys on a large scale, enhancing the discovery of active lesions, the close observation of lesions of undetermined activity and the periodic supervision of persons exposed to tuberculosis contact. The experiences resulting from mass surveys conducted in many countries have proved the possibility of spontaneous cure of a large number of tuberculous lesions, as shown by the finding of X-ray shadows of a residual type in many persons who have never been clinically ill. On the other hand it appeared that many residual lesions may become active during the course of observation; it also became obvious that roentgenological signs of activity are not necessarily accompanied by bacteriological or clinical evidence of activity, at least in certain phases of evolution. Isolation of active cases still remains the basis of prophylaxis. The concentration of a large number of patients in appropriate centres, where each patient is in contact only with a few healthy persons, seems to be preferable to their dispersion, where each patient represents a potential source of infection to many more healthy individuals. A diagnostic centre equipped with photoroentgenographic installation is replacing now the dispensary in its diagnostic function. This represents a definite progress because the cases are discovered earlier, thus receiving early treatment. Large scale periodic chest X-ray examination will reveal practically the totality of active lesions, while in the past the diagnosis was made mostly in a far advanced stage. The creation of special centres for active cases and for chronic or custodial cases will permit the concentration of the sources of infection, diminishing the number of exposed persons.—*El registro fluorografico base de la profilaxia de la tuberculosis, M. De Abreu, Rev. mex. de tuberc., November–December, 1945, 7: 377.—(L. Molnar)*

Tuberculosis Survey.—San Antonio, Texas, has the highest tuberculosis death rate of any large city in the United States. In coördination with a socio-economic survey, 20,350 persons were examined, using a 35 mm. photofluorographic unit. In suspicious and positive cases 14 x 17″ films were taken later. Reinfection tuberculosis of all stages was found in 993 (4.9 per cent) cases; in addition, 91 (0.4 per cent) had massive calcification, 258 (1.3 per cent) lesions suspicious of tuberculosis, and 125 (0.6 per cent) fibrosis. The incidence of reinfection tuberculosis was somewhat higher among the males. About 90 per cent of the persons examined were of Latin-American extraction, the remaining 10 per cent were mostly Anglo-Americans. There was no signicant difference in the incidence of tuberculosis between the two groups. However, the true incidence among Anglo-Americans is probably lower than found in this survey, since it must be noted that only a small number of Anglo-Americans was examined, and that those examined were probably aware of the disease or of contact with it. Of the 993 cases of reinfection tuberculosis, 430 (43.3 per cent) were minimal, 405 (40.8 per cent) moderately advanced and 158 (15.9 per cent) far advanced. With advancing age, the incidence increased from 1.2 per cent in the age group under 20 to 8.8 per cent in the 45 to 64 group. From the X-ray evidence, it must be assumed that the incidence of active tuberculosis among the Latin-

Americans is at least equal to, but probably higher than, the 3.0 per cent usually found in average surveys. Since the 18,607 Latin-Americans examined represent about 15 per cent of the Latin-American population of San Antonio, there must be approximately 5,100 cases of reinfection tuberculosis, at least 1,700 of them active, in this group of the city's population. The main reason for this high figure is poverty, with poor housing, poor diet and poor education as its natural corollaries. Among the causes of death in San Antonio, tuberculosis is second only to heart disease; for the country as a whole this was last true in 1910. Vigorous control measures are suggested.—*Mass X-ray Survey in San Antonio, D. M. Gould, Pub. Health Rep., February 2, 1945, 60: 117.—(P. Lowy)*

Resurvey of Industrial Plant.—An industrial plant with a relatively stabile population was surveyed twice with an interval of eighteen months. Of 97 persons that should have been detected in the first survey, 20, or 20.6 per cent, were missed—15 minimal, 4 moderately advanced. Of 88 persons who should have been diagnosed in the second survey, 10, or 11.4 per cent, were missed—9 minimal, one moderately advanced. Fatigue and eyestrain play some rôle, but inter-individual differences in interpretation, even under the best of conditions, are important. By the time of the second survey, 0.13 per cent of the previously surveyed population which was nontuberculous (3,926) had developed minimal tuberculosis; none of them had had any known exposure. This represents an annual incidence rate of 0.89 per 1,000. In the first survey, 80 per cent of detected cases had not been known before, while the corresponding figure was 40 in the second survey. The educational benefits of industrial surveys are stressed.—*An Evaluation of a Chest X-ray Resurvey of an Industrial Plant, M. Kramer, G. W. Comstock & J. B. Stocklen, Pub. Health Rep., July 5, 1946, 61: 990.—(M. Pinner)*

Tuberculosis Survey.—The results of a case-finding survey in New Orleans are tabulated and discussed. The survey included tuberculin testing (intracutaneous injection of 0.1 mg. of Old Tuberculin) and 35 mm. photo-fluorographic examinations. The survey covered persons in various socio-economic and racial groups, including college students, hospital employees, orphanage residents and clinic patients. Between October, 1943 and July, 1945, more than 20,000 persons were examined in this survey. This report deals with preliminary records of 8,571 persons who received the Mantoux test and X-ray examination. The figures showed that the local poor colored population had a higher incidence of tuberculous infection than the whites throughout all age groups. In both racial groups, the per cent of positive tuberculin reactions reached its maximum level between the ages of 40 and 50 years. The highest figure for the whites was 52.5 per cent and 65.5 per cent for the Negroes. During the age period 15 to 19 years, 24.9 per cent of the whites manifested a positive reaction and 34.2 per cent of the Negroes. Retesting with larger doses of tuberculin would have detected more cases. It is significant that even among the lower economic levels the incidence of infection is far from universal. The differences in tuberculin reaction between the two races paralleled the current tuberculosis death rates, 103.6 for the colored and 35.2 for the white race. The protective immunity, attributed by some to infection, apparently fails to protect the colored race from active disease. Lesions interpreted as calcifications appeared between the ages of 10 to 20 years in the positive and negative tuberculin reactors of both races. The incidence of calcifications for all ages combined amounted to 2.7 and 3.2 per cent, respectively, for the white negative and positive reactors and to 2.4 and 2.8 per cent, respectively, for the colored negative and positive reactors. Parenchymal infiltrations were reported in 103 or 1.2 per cent of the total group; the incidence of these lesions averaged slightly higher in the infected than in the uninfected members of each race. These infiltrations were encountered more frequently in the older age groups. Follow-up

studies on these infiltrations are still incomplete. Cardiac and aortic enlargement were the abnormal findings discovered with greatest frequency by photofluorographic examination. These changes were more frequent in the colored race and this difference may be attributed to the higher incidence of syphilis in the colored patients.—*A Tuberculosis Survey in New Orleans, C. A. Stewart, New Orleans M. & S. J., January, 1946, 98: 330.—(H. R. Nayer)*

Tuberculosis in Mental Institutions.—All patients and employees in the New York State Institutions for the Mentally Ill were X-rayed during the last few years. In the hospitals, 73,658 patients were examined and clinically significant pulmonary tuberculosis, according to roentgenological criteria, was diagnosed in 5.6 per cent. Prevalence is presented according to age-groups, showing considerable increase with increasing age and increasing length of confinement. Among 15,400 inmates of State Schools, the prevalence was 2.4 per cent. Among nearly 15,000 employees in these institutions, the prevalence was 1.1 per cent. The importance of segregating tuberculous patients and the inadequate facilities for this purpose are stressed.—*Prevalence of Pulmonary Tuberculosis in New York State Institutions for the Mentally Ill, J. Katz, R. E. Plunkett & Mary E. Thompson, Psychiatric Quart., October, 1945, 19: 644.—(M. Pinner)*

Miniature Chest Films.—Three thousand consecutive X-ray studies were made at the Edward J. Meyer Memorial Hospital, Buffalo, during a period of two and one-half months. This figure includes follow-up studies, reëxaminations and new admissions. Miniature films were used in 2,721 studies, conventional films in 326 and a combination of the two methods in 47. The miniature film consisted of a 4 by 10 inch film combining a stereoscopic pair of 4 by 5 inch films. The large film was used in patients unable to sit up, in small children and when oblique and lateral films were desired. During the period of the study 1,832 patients were admitted to the hospital. Unsuspected pulmonary tuberculosis was discovered in 36 admissions. It is felt that the stereoscopic photoroentgen film is an accurate method which offers economic and technical advantages in a large percentage of chest examinations. This method is particularly practical for routine chest films of all new hospital admissions.—*Miniature Chest X-ray Films in General Hospitals, G. N. Scatchard & Diana Olga Duszynski, J. A. M. A., March 31, 1945, 127: 746.—(H. Abeles)*

X-ray Generator.—An X-ray generator meeting the requirements indicated in the title of this paper is described and illustrated.—*A Light, Compact X-ray Generator of High Efficiency for Mass Radiography of the Chest, B. H. Morgan & E. G. Murphy, Pub. Health Rep., July 5, 1946, 61: 982.—(M. Pinner)*

Photofluorographic Roll-Film Viewers.—The criteria on which the efficiency of viewers should be judged, are discussed in connection with the now available viewers. In the past, the projection system of viewing has been in many respects preferable to the direct system of viewing, but improved direct viewers, which are becoming available, are now the most satisfactory ones.—*Photofluorographic Roll-Film Viewers, I. Lewis, Pub. Health Rep. March 1, 1946, 61: 294.—(M. Pinner)*

Finnish Sanatoria.—Sanatorium beds for tuberculosis in Finland numbered 2.05 per 10,000 population in 1919 as compared with 13.67 per 10,000 in 1938. Corresponding figures in Sweden were 8.86 and 14.95, respectively. Mortality rates per 10,000 population in Finland in 1919 and 1938 were 21.5 and 16.2, respectively; corresponding Swedish figures were 13.3 and 6.8. No significant difference in mortality rates was noted between city and country areas. Lower percentages of deaths in sanatoria were recorded in 1919 as compared with 1938: in Finland, the figures for those two years were 3.0 and 19.7; Sweden, 19.3 and 58; Norway, 15 per

cent in 1923, 47 per cent in 1939; Denmark, (except Copenhagen) 31.3 in 1921 and 62 in 1938. More sanatorium beds are urgently needed, not only for open cases of tuberculosis, but for terminal cases as well.—*Über die Entwicklung der Heilanstalten für Lungenkranke in Finnland in den Jahren 1919–1938, A. Honkanen, Acta tuberc. Scandinav., 1946, 20: 89.—(P. Q. Edwards)*

Tuberculin Testing.—An investigation was carried out with a view to comparing the sensitivity of children to three forms of the tuberculin skin test, first the Mantoux intracutaneous test; second, the Vollmer patch test; third, the diagnostic tuberculin jelly tests. Of 380 children tested, 180 reacted to at least one of the tests. With Mantoux test an initial dose of 1:10,000 Old Tuberculin was used; when negative this was followed by a dose of 1:1,000. The results showed that, as compared with the Mantoux test, the Vollmer patch tests were unreliable to the point of being valueless. The reaction to the diagnostic tuberculin jelly varies markedly. In a hospital series, cases attending a children's hospital that were found to be suffering from unexplained cough or glandular enlargement or showed other signs or symptoms giving rise to a suspicion of tuberculosis, or children who gave a history of contact with open tuberculosis, 47 per cent of reactors to 1:10,000 Mantoux reacted to jelly; 30 per cent were positive to the Vollmer patch test. In a sanatorium series, cases diagnosed on clinical, radiological or bacteriological grounds as active tuberculosis, 94.8 per cent of Mantoux reactors reacted to the jelly and 54 per cent to the patch test. Of the 21 cases that reacted to the Mantoux test only when performed with 1:1,000, one gave a positive reaction to the jelly, and none to the Vollmer patch test.—*Tuberculin Testing in Children: A Comparison of Methods, D. Dell & Jerram, Brit. M. J., August 18, 1945, 2: 215.—(D. H. Cohen)*

Tuberculin Patch Tests.—One hundred subjects were tested by various methods, with the indicated number of positive results: Percutaneous patch test, with tuberculin jelly 41, with liquid tuberculin 42, intracutaneous tuberculin PPD first strength 54. The results indicate little difference between percutaneous patch tests, but slight inferiority to the intracutaneous test.—*A Comparison of Two Types of Tuberculin Patch Test, H. Climie, Brit. J. Tuberc., April–July, 1945, 39: 61.—(A. G. Cohen)*

Histoplasmin Reactors.—During the year 1945 more than 10,000 student nurses were tested with histoplasmin given intracutaneously. The nurses were distributed in 11 cities and the prevalence of reactors varied between 4.8 and 58.1 per cent. Of all students tested, 8,141, or 77 per cent, were suitable for a detailed study of the geographical distribution of histoplasmin reactors, because they were "life-time residents," which means that they had spent five-sixths or more of their life in the same state. Analysis showed that prevalence is largely determined by geography. An area of high prevalence seems to exist in the eastern central part of the United States. [However, in many large areas of the United States no tests have been done, as yet.]—*Geographic Differences in Sensitivity to Histoplasmin among Student Nurses, C. E. Palmer, Pub. Health Rep., April 5, 1946, 61: 475.—(M. Pinner)*

Histoplasmin Reactors.—Histoplasmin and tuberculin skin tests and chest roentgenograms were done on more than 17,000 persons in Kansas City. A slightly higher reactor rate for histoplasmin was found in whites (78.5 per cent in 610 males and 53.8 per cent in 158 females) than in non-whites; it was higher in males than in females and higher in lifetime residents than in non-lifetime residents. Tuberculin reactor rates are three times as high in Negroes as in whites. The frequency of pulmonary calcifications is over twice as high in histoplasmin reactors as in reactors to tuberculin alone. With increasing age, both tuberculin and histoplasmin reactors increase more frequently than do pulmonary calcifications, probably because allergy to

either substance is more rapidly developed following infection than is calcification.—*Some Epidemiological Aspects of Sensitivity to Histoplasmin and Tuberculin, M. L. Furcolow, H. H. High & Margaret F. Allen, Pub. Health Rep., August 2, 1946, 61: 1132.*—(*M. Pinner*)

Tuberculosis in Medical Students.—An extremely detailed and well documented statistical study of three groups of medical students who after one or more years of hospital training entered the hospital services of the Paris Assistance Publique in 1937, 1938 and 1939, respectively. The report comprises two major parts: the first part deals with the findings on initial examination of the students before their admission to the hospital services. The second part, completed in 1943, reports the result of follow-up findings on these groups after a time interval of several years (six years for the 1937 group, five years for the 1938 group, and four years for the 1939 group). The average age was 22.5 years. The 1,047 students, seen on initial examination, were divided in three categories: (*1*) A group of 9 cases in whom the first examination revealed active pulmonary tuberculosis (0.85 per cent). In 3 of these cases diagnosis of pulmonary tuberculosis had already been made prior to this routine examination and treatment had been instituted. (*2*) The second category comprised healthy students with a positive tuberculin test (87.8 per cent). (*3*) Healthy students with a negative tuberculin test (11.35 per cent). Comparison of the percentage of negative tuberculin reactions among medical students with the percentage of negative reactions among other students of the same age group, shows that it is about two to three times higher in the latter due to lack of hospital exposure. The group of 904 healthy individuals with positive tuberculin reactions was divided in two sub-groups: (*1*) cases with completely negative X-ray findings (72.8 per cent); (*2*) cases in which X-ray examination revealed sequelae of a previous pulmonary or pleural involvement (27.2 per cent). These sequelae consisted mostly in pulmonary or lymph node calcifications and more rarely in pleural thickening and obliteration of the costophrenic angle. The group of 904 tuberculin reactors was questioned very carefully about their previous medical history. Only 55 (6.09 per cent) had had in their recent or remote past a morbid incident which could with certainty or with more or less probability be related to a primary infection. The percentage of clinically silent primaries as estimated after history-taking would thus amount to 93.91 per cent. Primary infection with possible or certain clinical manifestations in the past occurred in 4.1 per cent of the cases with a normal X-ray film on the initial survey examination, and in 11.3 per cent of cases whose X-ray film showed evidence of previous involvement. The incidents in the past history are classified as follows: 8 cases of erythema nodosum, 24 cases of sero-fibrinous pleurisy (only 12 of which were confirmed by aspiration), 6 cases of so-called typhoid or paratyphoid (not verified bacteriologically or serologically), 4 cases of so-called pulmonary congestion, grippe, etc., 7 cases of unexplained weight loss, fatigue, subfebrile temperature and cough, 3 cases of extrapulmonary tuberculosis (tuberculous keratitis, renal tuberculosis, tuberculosis of the humerus and the knee-joint), 4 cases of "reinfection tuberculosis." It is emphasized that much caution and reserve has to be exerted in the evaluation of these retrospective diagnoses. Follow-up of the three groups of students in 1943 revealed the following findings: The group of 116 cases with negative tuberculin test on initial examination showed in 1943 the following distribution: 34 cases had disappeared during the war; 11 had not been tuberculin tested again, but were known to be well; 6 cases had still a negative tuberculin reaction; 2 cases had a positive tuberculin test consecutive to administration of BCG; 34 had become tuberculin-positive without any clinical manifestations; 17 had become tuberculin-positive, the conversion being accompanied by clinical symptoms, but with no

alteration on the X-ray film; 12 had become tuberculin-positive with X-ray alterations. This analysis shows 55 per cent with symptomless primaries, directly observed as such, as compared to the 93 per cent apparently symptomless primaries as found on simple interrogation during the initial examination. The clinical symptoms accompanying the conversion of a negative into a positive tuberculin reaction were found to be (in order of frequency): (*1*) fever, (*2*) weight loss without apparent reason, (*3*) fatigue. Four instances of very slight expectoration of blood or blood-streaked sputum, occurring only once in each case, are reported in this connection. It is emphasized that cough appears to be one of the rarest symptoms of a primary infection. Among the 28 cases of primary infection accompanied by clinical symptoms only 11 showed a lesion which was demonstrable on X-ray films (30 per cent). Nine out of these 11 cases have shown resolution or scarring of the primary focus after three to six months of sanatorium care. In only 2 cases the primary lesion went on to excavation and had to be treated with pneumothorax. One of these cases died. This was the only death among 63 primary infections having occurred within the whole period of observation of the medical students. Among the 640 students who were tuberculin-positive on the first examination 28 (4.3 per cent) developed a clinically manifest reinfection tuberculosis. This percentage is considered remarkably low as compared to the percentage of clinically manifest primary infections (34.1 per cent) observed during the same period of time. The latter were almost always very benign. Among the 28 cases with reinfection tuberculosis 13 developed cavitary disease and 4 extensive infiltrations of the lobar type. Pneumothorax was instituted in 15 cases. Only 8 cases with "benign" or abortive lesions were observed. The initial symptons in these cases of reinfection tuberculosis were (in order of frequency): (*1*) cough; this was found to be an important initial symptom in contradistinction to primary tuberculosis; (*2*) hemoptysis; (*3*) fever, fatigue, chest pain, weight loss. The question was brought up whether active reinfection tuberculosis is more likely to occur in persons with a negative X-ray film or with an X-ray film showing residual involvement as described above. It was found that both groups showed essentially the same incidence of reinfection tuberculosis. Among the 24 cases giving a history of pleurisy only one developed reinfection tuberculosis. As to the recovery of the diagnosed cases, the results are reported as follows: 40 out of 49 have taken up normal medical activity and are working as physicians; 15 cases were treated with pneumothorax. All cases had undergone rest treatment, the average duration of which was fourteen months (ranging from three to five months for primary lesions up to three to four years for reinfection tuberculosis). The fatality was 6.12 per cent. None of the patients is said to have become a "chronic" case. None represents a source of infection. Six cases are still continuing treatment. These figures are considered very satisfactory when compared to statistics in other groups of the population, with fatality rates as high as 43 per cent and only 18 per cent recoveries. The reason for the more favorable results in medical students is seen in their economic status, in the regular and close follow-up leading to early diagnosis, in the institution of early treatment, and in the greater readiness to accept therapeutic measures.—*Le controle phthisiologique des externes et internes des hôpitaux de Paris, M. E. Rist, avec la collaboration de Edith Mage, Recueil des travaux Inst. Nat. d'hyg., 1944, 1: 902.*—(*V. Leites*)

Tuberculosis in Medical Students.—Surveys were carried out on 1,200 Paris medical students between the years 1939 and 1942. The routine consisted in history, physical examination, tuberculin test, fluoroscopy, and possibly roentgenogram. The tuberculin test was performed with the cutaneous method (Pirquet), and if this proved negative the intracutaneous test (Mantoux) was performed ten days later with 10 mg. of tuberculin. Among 1,148 students between the ages of 18 and 25, 60.6 per cent showed a

positive Pirquet; 170 (24.4 per cent) of these had a highly positive phlyctenular reaction. An additional number of 62 individuals (13.7 per cent) had a negative Pirquet but a positive Mantoux. Thus, 74.3 per cent tuberculin reactors were found. It is emphasized that the anergic and hyperallergic persons should be particularly closely observed. The former are believed to be potentially the candidates for a progressive or "phtisiogenic" primary infection in case of massive exposure or low resistance, the latter are considered to be cases of a recent primary tuberculosis and apt to develop a form of early tuberculosis described as "postanergic." The X-ray survey revealed a normal X-ray film in 828 cases, increased pulmonary markings in 93 cases, pulmonary or hilar calcifications in 199 cases, pleural sequelae in 48 cases, tracheobronchial adenopathies in 6 cases, fresh infiltrations in 6 cases, fibrous or well circumscribed lesions in 14 cases, and nontuberculous infiltrations in 6 cases. Comparison is made between the morbidity before the admission to medical school and the morbidity found in the course of the medical studies. On the initial examination 6 cases (0.5 per cent) showed evidence of an active primary or postprimary tuberculosis. All these patients were watched closely and sent for a rest-cure to the country. One case subsequently developed pleurisy, another erythema nodosum. One patient died of tuberculous meningitis. Active reinfection tuberculosis with positive sputum was found in 6 cases (0.5 per cent); 14 cases showed old and apparently inactive lesions with negative sputum. The total incidence of fresh and old lesions on the initial examination was 2.16 per cent. The morbidity of tuberculosis in the course of the medical studies was three times as high: 1.64 per cent of active primary infections, a third of which were complicated by pleurisy, and 1.52 per cent of reinfection type tuberculosis. In 191 cases with negative tuberculin reaction BCG was administered (mostly by the scarification method or by intracutaneous injection). The latter gave the best results in producing a positive tuberculin reaction in 86.4 per cent of cases within three to six weeks. However, no conclusions are drawn as to the persistence of this state of allergy and its immunizing properties.—*Le dépistage systematique de la tuberculose chez les étudiants en médecine, J. Troisier & P. Nico, Recueil des travaux Inst. Nat. d'hyg., 1944, 1: 288.*—(*V. Leites*)

Tuberculosis among Prisoners of War.—The author spent four years as a prisoner of war in charge of a special tuberculosis hospital and tuberculosis cases in a general hospital for prisoners of war. The conditions in general were definitely very bad, with the Russians getting the worst. Average daily caloric estimation of food for these hospital patients was 1200 to 1800, and not very good food at that. British and American Red Cross parcels helped in many cases. Routine mass radiography was used "for fear that tuberculosis prisoners would infect German civilian workers". The diagnosing of the films was in general poor. There were also cases where the films were correctly diagnosed but no action was taken. Of 68 consecutive sputum-positive cases admitted, 19 had been diagnosed by means of radiography; the remaining 49 were diagnosed by clinical means. Of the latter, 13 had had routine skiagrams and been "missed", or were found positive but no action had been taken. Language difficulty in history-taking and suspicion among prisoners of war of other nations made diagnosis and adequate treatment difficult. The cemetery outside of one hospital, a surgical and medical unit, had 80 per cent of graves filled with victims of tuberculosis. Transport conditions were abominable. Diabetics travelled days without insulin, for example. The statistics were very unreliable for a variety of reasons. Of 44 positive cases with at least three months' hospital stay 39 had pneumothorax attempted, 31 successfully. Two were bilateral and 5 were abandoned. Seven of the 13 abandoned or unsuccessful cases had phrenics. Of the successful pneumothorax cases which were not abandoned (26), 20 had thoracoscopies with or without

adhesion-section. Of all those, one died and 24 became negative before leaving, after an average of 3.3 months in hospital.—*Tuberculosis among Prisoners of War in Germany, A. L. Cochrane, Brit. M. J., November 10, 1945, 2: 656.*—(*D. H. Cohen*)

Tuberculosis among Prisoners of War.—Among 15,000 Frenchmen in a German prison camp 500 (3 per cent) developed pulmonary tuberculosis over a period of two and a half years. Among 100 cases of pulmonary tuberculosis followed during 1943 the clinical forms are described as follows: 16 acute forms with lobar, bronchopneumonic, or nodular lesions; 58 progressive cavitary forms with positive sputum; 8 early infiltrates with positive sputum; 22 subacute forms with negative sputum but extensive lesions by X-ray; 46 cases were bilateral, 58 unilateral. Certain particular features were noted such as the shortness of the initial period (two to three weeks on the average); long periods of weight loss, fever and nightsweats were rarely seen. There was usually a brief phase of "impregnation" with marked symptoms. A cavity was often present at the first examination. Evidence of tuberculosis in the family history or in the past history of the patient were found very infrequently. Rapid improvement as a response to rest and pneumothorax treatment is reported. Among 100 cases, pneumothorax was attempted in 66 and was considered successful in 56. The indications of pneumothorax were deliberately extended in order to hasten repatriation. Comparison of the incidence of tuberculosis in the years 1941, 1942 and 1943 did not reveal marked differences. Pleurisies were found in great frequency. From 1940 to 1943, 169 pleurisies with high fever and severe constitutional symptoms were hospitalized. This figure does not include pleurisies of moderate degree which were not admitted to the hospital and not considered for repatriation by the Germans. It is believed that these very numerous cases of pleurisy inadequately treated due to German restrictions will give rise in the years to come to a high number of cases of pulmonary tuberculosis. An additional report is given on the Russian prisoners of war. Soldiers of all ranks were compelled to work and received smaller food rations than prisoners of other nationalities. In case of illness, accident or severe fatigue they were sent for a rest. If they did not regain their working capacity they were sent to a special camp in Zeltheim and allowed to die of starvation. Among 1,229 Russians observed in the hospital 170 (15 per cent) had pulmonary tuberculosis; 114 had pleurisy. Of the latter, 75 were sent back to work after one month of rest, 15 died in the hospital, the rest was sent to Zeltheim to die. Among the 170 cases of pulmonary tuberculosis, 8 were sent back to work, 60 died in the hospital and the rest sent to Zeltheim.—*La tuberculose pulmonaire chez les prisonniers de guerre en Allemagne, Ph. Couve, Rev. de la tuberc., 1944-45, No. 10, 9: 220.*—(*V. Leites*)

Marital Tuberculosis.—Preceding the original study a critical review of the literature on marital tuberculosis is given, the incidence of which is still a question of controversy, figures being reported as widely apart as 4 and 46 per cent. The statistical findings being so little comparable, diametrically opposite conclusions concerning pathogenesis and prophylaxis of tuberculosis have been drawn. The reasons for the extremely discordant results is seen in the following factors: (*1*) lack of precision in the definition of marital tuberculosis, exact distinction is not made between double morbidity, double mortality, positive and negative cases, active and inactive tuberculosis, sequelae of primary infection, etc. (*2*) Insufficient information on the nature of the disease in the marital partner first taken ill. (*3*) Insufficient information on the contact between the marital partners (duration, intimacy, presence or absence of precautions, positive or negative sputum). (*4*) Insufficient information on the condition of the exposed partner before exposure. (*5*) Errors of statistical evaluation, such as not taking into account the time factor, comparing incomparable data, comparing data

derived from too small and too large numbers, etc. There were 2,300 cases of pulmonary tuberculosis with positive sputum investigated for this study. It was found that 12 per cent of their marital partners had pulmonary tuberculosis with positive sputum. In an additional 7 per cent, routine examination revealed definite pulmonary tuberculosis with negative sputum; 27 per cent showed pulmonary calcifications and very discrete fibrotic lesions on X-ray films. (In evaluating these figures it must be noted that only a relatively small percentage of contacts responded to the convocation for routine examination.) The above figures are considered to be at least three times as high as those found on routine examination of not particularly exposed groups. Widows and widowers with pulmonary tuberculosis appeared to have lost their partners more often from pulmonary tuberculosis than widows and widowers with nontuberculous disease. The average duration of exposure was two years and four months (ranging from one month to fifteen years). The average time interval between the onset of disease in the partner first taken ill and the onset in the partner developing tuberculosis subsequently was five years (with a minimum time interval of two months and a maximum of twenty-five years). In 48 per cent of cases the interval was longer than three years. Two periods are considered particularly dangerous for the exposed partner: (*1*) the first two years of exposure during which time the persons with low resistance to tuberculosis are believed to become infected; (*2*) the two years following the death of a partner, during which more resistant individuals may develop the disease, due to massive contamination preceding death. The relatively high incidence of pleurisy as a mode of onset in marital tuberculosis was noted. It was found in 13 per cent of cases.—*Études sur la tuberculose conjugale, Tulou & Parrique, Recueil des travaux Inst. Nat. d'hyg., 1945, 2: 333.*—(*V. Leites*)

Infectiousness of Closed Cases.—Children of the ages of 3 to 24 months placed in homes of "closed" cases of tuberculosis had an incidence of tuberculin sensitivity of 5 to 10 times higher than that of children of the same ages housed among persons free from tuberculosis. Unless the standards formulated by the U. S. Public Health Service and the Committee on Diagnostic Standards of the National Tuberculosis Association are complied with in the examination of sputum—namely, absence of bacilli on concentration, culture and guinea pig inoculation—the term "closed" should not be used, for it is clear from this study, and from those of previous observers, that the so-called "closed" case of tuberculosis is a marked source of contagion of tuberculosis.—*Infectiousness of the "Closed Case" in Tuberculosis, M. Blahd, E. I. Leslie & S. R. Rosenthal, Am J. Pub. Health, July, 1946, 36: 723.*—(*M. B. Lurie*)

Tuberculosis in Children.—The finding of primary tuberculosis in a child establishes two important facts: (*1*) Usually a contagious case has been in the child's environment. (*2*) The child has at least lesions of primary tuberculosis containing living tubercle bacilli. His tissues have been sensitized to tuberculoprotein making reinfection from exogenous or endogenous sources far more dangerous. The tuberculin reaction is the best criterion of the tuberculosis situation in a community with a stable population. A large percentage of infected persons at some time have clinical lesions. The results of tuberculin tests adminstered to children in Minneapolis are as follows: In 1926 approximately one of each 2, in 1936 one in each 5 and in 1944 one in each 13 children had primary tuberculosis. In 1926 and in 1936 0.1 mg. of tuberculin and if negative 1.0 mg. were used, in 1944 only one test dose of 1.0 mg. was used. The tests were done by one physician. The same physician read all the tests after seventy-two hours. The decrease of reactors could be ascribed, among other reasons, to an increase in hospital beds for tuberculosis patients, to control of tuberculosis in cattle and to quarantine of incorrigible, contagious cases. Among the 512 children

found to have a positive tuberculin reaction in 1944 the families of 385 children had no knowledge of their having been in contact with contagious cases of tuberculosis. Although chronic reinfection type of pulmonary tuberculosis is very rare in children, all children with a positive reaction to tuberculin should have a chest X-ray examination. Four hundred and ninety-five children of the 512 reactors had a chest X-ray film. Calcium deposits were found in 68 children. The only method which is scientific, accurate and wholly satisfactory for discovering the early chronic tuberculous lesion is that which makes annual X-ray inspections of the chests of adult tuberculin reactors with complete examinations of those with lesions which cast shadows.—*The Importance of Detecting Tuberculosis in Children, J. A. Myers, F. E. Harrington & E. G. Suarez, J. A. M. A., July 21, 1945, 128: 852.*—(*H. Abeles*)

Tuberculosis in Children.—Twenty-one cases of chronic miliary tuberculosis are reviewed. They were all children aged one to 14 years, with hematogenous dissemination of tuberculosis into both lungs, who survived a minimum period of three months. Seven showed no definite change in the X-ray appearance during a period of less than six months; 6 died and one was lost from observation. Twelve showed radiological retrogression; in 9 of these eventually no definite abnormality could be seen. In one case multiple small cavities appeared, and in the remaining one healing took place by massive calcification. Of the 21 cases, 8 died; the period of survival ranged from three months to seven years and nine months. Six of these behaved like acute miliary tuberculosis except that they survived a little longer. The other 2 ran a more chronic course. The remaining 13 are alive after six months or more, the longest being eleven and one-half years. The mortality rate appeared to be greater among the older children; there was no differenece between sexes. Seventeen patients had enlarged thoracic lymph nodes. Five had pleural effusions; in one of these the effusion was bilateral. Two patients had atelectasis and 2 had postprimary cavities. Four had enlarged cervical nodes. Three developed one or more extrapulmonary lesions. It is pointed out that a paratracheal node is the most likely focus of the initial hematogenous spread. Therefore, the appearance of high paratracheal nodes in children with primary tuberculosis should be regarded as a danger signal.—*The Prognosis of Chronic Miliary Tuberculosis in Children, R. B. Illing, Brit. J. Tuberc., October, 1945, 39: 79.*—(*A. G. Cohen*)

Tuberculosis in Children.—A series of 445 hospital cases is reviewed; 387 had pulmonary tuberculosis and 58 had pleural effusions. The diagnosis was based upon a history of contact with an open case, a positive Mantoux test, the age of the child and the presence in the roentgenogram of at least enlarged hilar nodes. Many of these factors are present in other diseases so that a certain diagnosis is often difficult. X-ray films are taken in the antero-posterior position with the child lying on top of the film. Lateral views occasionally are helpful. The average period of hospitalization varied inversely with the age. There were 16 deaths. The chief causes of death were acute miliary disease, meningitis and caseous pneumonia. Atelectasis was the most frequent complication, particularly in children under 6 years of age. Endoscopic examination in these cases often revealed narrowing of a main bronchus due to extrabronchial pressure. In some cases there was perforation of a lymph node through the bronchial wall with resulting endobronchial tuberculosis. In 50 per cent of the atelectasis cases the lung reëxpanded uneventfully; 15.6 per cent developed bronchiectasis and 34.4 per cent were discharged with atelectasis still present. There were 11 cases of caseous pneumonia with 8 deaths. In 27 cases there was significient parenchymal involvement arising by local spread from the primary focus or through the blood stream. Pleural effusion occurred in 69 cases. There were 8 cases of acute miliary disease of which 7 were fatal; one of the older patients survived.

Six children died of meningitis. Less frequent complications were mesenteric or cervical adenitis, bone and joint tuberculosis, phlyctenular conjuctivitis and erythema nodosum. Adequate treatment is best obtained in an institution.—*The Problem of Childhood Tuberculosis with Special Reference to the Younger Child, W. F. Richards, Tubercle, July–August, 1944, 25: 60.*—(*A. G. Cohen*)

Tuberculosis in Children.—The author feels that public health authorities are underestimating the importance of primary tuberculosis in children. Although the majority pass through their primary infection and are none the worse for it, and although only a very small proportion progress to tuberculous meningitis, yet there is much pain and illness due to bone, joint and kidney disease following a primary infection. It is also important because it is common; it is often difficult to diagnose; it most easily leads to tracing of the adult infector; and when adequately treated it gives excellent results. The ordinary symptoms of adult tuberculosis are usually absent. Erythema nodosum and phlyctenular conjunctivitis are very suggestive of primary tuberculosis. They are not themselves tuberculous, but are manifestations of tuberculin allergy. X-ray films are of value, especially serial films, as there are few other causes of persisting abnormal lung shadows in childhood. The tuberculin test is the only sure diagnostic test. Concentrations of Old Tuberculin as high as 1 to 10 are used in this determination and the Mantoux test is definitely preferred. If 100 per cent be allotted to the Mantoux test in the diagnosis of primary tuberculosis, then X-ray earns 25 per cent and physical examination a fraction of 1 per cent. Treatment involves bedrest until the sedimentation rate is normal and skiagrams show evidence of healing or the lesion appears quiescent. Separation from discovered contacts is very important. There is ample evidence that breaking the contact materially lessens the mortality and morbidity. The death rate is higher in the first two years of life, so here, adequate treatment and follow-up are very important. Among in-patients the commonest diagnostic difficulty is probably differentiation between appendicitis and tuberculous mesenteric lymph nodes. Here, to wait for the result of the Mantoux test is impracticable, and in cases of doubt the surgeon will always operate.—*Primary Tuberculosis in Childhood, W. F. Gaisford, Brit. M. J., January 19, 1946, 1: 84.*—(*D. H. Cohen*)

Atelectasis.—Among 300 cases of wedge-shaped atelectasis in children, 154 occurred in pulmonary tuberculosis, 69 in influenza and influenza pneumonia, 47 in whooping cough and 30 in measles. In the usual posterior-anterior roentgenograms these shadows often had a linear appearance. X-ray films were taken routinely in the lordotic position and in the lateral view, eliciting the triangular form, with the apex of the triangle pointing towards the root of the lung and the basis towards the periphery, corresponding to a bronchial obstruction in a segment. The lower border of the opacity represented a concave line. In contradistinction to massive lobar atelectasis, wedge-shaped atelectasis usually did not produce a displacement of the mediastinal structures. The symptom of Holzknecht-Jacobson is considered of diagnostic value (pendular movements of the center of the opacity during in- and expiration). This sign was found in 63 per cent of atelectases due to tuberculosis in children. Another sign of diagnostic significance is the diminished motion of the diaphragm on the side of the atelectasis. The authors are definitely opposed to the interpretation of linear and wedge-shaped shadows as interlobar pleurisy. In their series of cases the presence of a pleural effusion could not be demonstrated, neither by aspiration nor on postmortem examination in the patients who died. The absence of convex contours and the absence of a reaction of the parietal pleura also is believed to speak against the diagnosis of interlobar pleurisy and for the diagnosis of partial atelectasis.—*X-ray Diagnosis of Cuneiform Atelectasis*

and Its Significance in Childhood Tuberculosis, V. I. Brjum, Probl. tuberk., 1945, 4: 18.—(V. Leites)

Disseminated Tuberculosis in Children.—Nine cases of chronic disseminated tuberculosis in children were observed. These showed a variety of clinical phenomena. All but one had prolonged fever. Only 3 cases gave a history of contact with a tuberculous patient. In some cases, the onset resembled that of an acute respiratory condition; the true nature eventually was disclosed by tuberculin testing and X-ray examination when resolution failed to occur. The onset in other cases was that of unexplained fever; in one extrapulmonary lesion was the first manifestation. The blood sedimentation rate remained elevated over long periods of time, but fell at the time of impending recovery. The results of the Mantoux test varied. There were either no abnormal physical signs or only a few scattered râles. The spleen was not palpable in any case. Death in most cases was due to meningitis. There was considerable variation in the roentgenographic picture. In some cases, the foci resembled those of bronchopneumonia. In others, the infiltrations were very fine. After remaining unchanged for many months, the lesions may clear rather quickly. Necropsy was performed in 4 out of 5 fatal cases. A completely active primary complex was demonstrated in 3 cases; only the glandular component was seen in the fourth case. Death in 3 cases was due to meningitis, and in the fourth to progressive pulmonary disease. There was evidence in all cases of a hematogenous invasion. Numerous organs were involved. In the 3 cases terminating in meningitis, there was evidence of repeated disseminations. Larger caseous and partially calcified foci were found in the lungs, liver and spleen. These were believed to represent remnants of the earliest postprimary dissemination. They have been described by such names as Simon's or Aschoff-Puhl foci. Even when calcified, they may contain considerable numbers of tubercle bacilli. Microscopic examination of the miliary foci showed various stages of healing or caseation.—*Chronic Disseminated Tuberculosis in Children, J. C. Roberts & E. Nassau, Tubercle, March-April, 1945, 26: 43.—(A. G. Cohen)*

Primary Tuberculosis.—In 460 children PPD and Vollmer patch tests were done. If the test with 0.000,02 mg. PPD was negative, 0.005 mg. was given. One hundred and fifteen children reacted to at least one of the tests. Among 293 Negro and Mexican children, 86 (29 per cent) had positive tuberculin tests; among 167 white children, 29 (17 per cent) had positive reactions. One hundred children reacted to both tests; 14 reacted to one of the purified protein derivative tests and did not react to the patch test; one child reacted to the patch test and not to the PPD test. Roentgenological examination revealed calcified hilar lymph nodes in 84 cases (75 per cent). A history of contact was elicited in 44 cases (38 per cent). None of these children had a prolonged fever. Blood counts, done in 110 children, were normal. Gain of weight and height in the children with primary tuberculosis were the same as in a control group. There were no abnormal findings on repeated percussion and auscultation.—*A Roentgen Ray and Clinical Study of Primary Tuberculosis: Vollmer Patch Test Made on Four Hundred and Sixty Patients; Positive Reactions Secured in One Hundred and Fifteen, A. D. Biggs, with the technical assistance of Irene Stolp, Arch. Int. Med., April, 1946, 77: 393.—(G. C. Leiner)*

Treatment of Primary Tuberculosis.—The setting up of the control group is extremely important. Age at which primary infection occurs or at which disease first appears must be considered. The younger the child during infancy and pre-school age the greater the risk that the course will be unfavorable. Of 39 children up to the age of one year, the fatality rate was 35.9 per cent. The fatality rate dropped for each age group until it reached 0.8 per cent for the 7 to 16

year group. The duration of tuberculous infection is another important factor. In children of the same age group decreased death risk runs parallel for the most part to the time interval since tuberculin positivity first occurred. When the primary focus is calcified the risk that disease will end in death in childhood is practically nonexistent, while for infants with acute febrile forms of clinically established primary tuberculosis the prognosis is unfavorable. Therefore, the age of the tuberculous infection is of greatest significance in young infants. Parenchymal distribution as seen by X-ray is less significant. Probably this is due to inability to determine the actual anatomical foundation in the living patient. The lesion may be a gelatinous caseous pneumonia, absorbable epituberculosis or atelectasis. Atelectasis is extremely common and may appear very serious although the actual underlying tuberculosis may be extremely mild. In Wallgren's experience, atelectasis is especially likely to occur when the primary tuberculosis is a couple of months old. Another circumstance which decreases the prongostic value of the chest X-ray film is that death occurs more as a result of early postprimary dissemination than of progressive primary tuberculosis of the lungs. Of 104 infants dying of tuberculosis, only 17 died of progressive primary tuberculosis of the lungs. Tubercle bacilli can most commonly be demonstrated in gastric washings of infants with absolutely fresh disease and least often in children with calcified primary foci. As prognosis is least favorable in the former category and most favorable in the latter, it would seem logical to look for some prognostic indication other than that furnished by gastric lavage. In school children with absolutely fresh primary tuberculosis, tubercle bacilli were found in 50 per cent; yet the prognosis was extremely favorable. Often positive sputa are only obtained after having examined three or four specimens. Other factors, such as inherited disposition, constitution, massiveness of exposure are vague and difficult to define. Therefore, the leading principles for evaluating the effectiveness of methods for treating primary tuberculosis in children are: (*1*) Two groups should comprise a large number of individuals, about the same number in each group. (*2*) The children in the two groups must belong to the same age distribution. (*3*) The age of the tuberculous infections must be the same in the two groups. (*4*) There should be no essential difference in the two groups with respect to the size of the primary focus, heredity, constitution and intensity of exposure. There follows a discussion of a paper by M. I. Levine, "Primary Tuberculosis: Effect of Unrestricted Activity on Prognosis," Am. J. Dis. Child., December, 1944, 68: 385. Levine's findings in American children are contrasted with those of Wallgren in Swedish children.—*Evaluation of the Effectiveness of Therapeutic Measures against Primary Tuberculosis: Consideration of Some Leading Principles, A. Wallgren, Am. J. Dis. Child., November–December, 1945, 70: 263.*—(*K. R. Boucot*)

Primary Tuberculosis in Adults.—Studies conducted among university students in Stockholm reaffirmed the fact that primary tuberculosis in adults is generally a benign disease. The conversion of a negative to a positive tuberculin test is usually unaccompanied by demonstrable evidence of pulmonary or other disease. When definite clinical evidence of tuberculous disease is present, the prognosis is still good. The primary pulmonary foci and the hilar lymphadenopathies generally show a tendency to regress quickly, and it is unlikely that they give rise to progressive pulmonary tuberculosis. The material again demonstrates the increased risk among medical students as compared to those in other institutions of higher learning. The study includes a total of 6,629 students. Of this group, 935 were tuberculin-negative in dilution up to 1 mg. Of this negative group, 727 could be retested and 251 were found to have become tuberculin-positive, and 34 of these showed definite clinical manifestations of tuberculous disease, such as pleurisy with effusion, erythema

nodosum, pulmonary parenchymal foci with hilar adenopathy or only hilar adenopathy. Two infections were apparently due to injury from autopsy material and the primary lesions were on the hand. In 5 of the 34 cases it was believed that the roentgenographic abnormalities were not due to the primary infection but demonstrated postprimary "initial" foci. It is of interest to note that medical students not only showed a higher percentage of reversal of tuberculin reactivity, but among those who had turned positive a significantly higher percentage developed clinical tuberculosis. It would appear that the infecting dose is of great significance in this respect, and that casual contact does not carry as great a risk as intimate contact.—*Zur Frage der tuberkulösen Primärinfektion bei jungen Erwachsenen, S. Bergquist & T. Ernberg, Acta med. Scandinav., September 15, 1948, 115: 57.*—(*H. Marcus*)

Primary Tuberculosis.—Pathogenesis of the primary complex is reviewed after a study of 400 children and 200 carefully selected adults. Various morbid processes are discussed: early confluent tuberculous pneumonia, extrapulmonary disease in the presence of healing or regressing lung lesions, progressive primary complex, rupture of caseous hilar nodes into the lung, reactivation of old calcified lesions or extrapulmonary foci, fifteen or twenty years after the primary complex has apparently healed, perforation of a calcified node into a bronchus, perhaps causing hemorrhage, reactivation of the primary parenchymal lesion. The old problem of endogenous *vs.* exogenous reinfection is revived briefly in order to cite evidence for endogenous reactivation of a primary complex many years after apparent healing. Nine illustrative case histories are given.—*The Primary Infection of Tuberculosis (A Hazard), M. Herman, Florence C. Levin & S. E. Thompson, Quart. Bull. Sea View Hosp., April, 1946, 8: 156.*—(*P. Q. Edwards*)

Genetic Factor in Tuberculosis.—During the last half century, the factors of heredity, constitution and surrounding have been underestimated in favor of the purely infectious and immuno-biological aspects of tuberculosis. It is now time to revaluate their importance. Tuberculous contact alone does not suffice for the appearance and progress of the disease. Only massive and frequently repeated infection is capable to overcome the defenses of the body. An explanation has to be found why so often people resist the exposure to contact and why so many people contract tuberculosis without any known contact. All statistics show that 83 per cent of the immediate contacts of tuberculous patients do not contract tuberculosis despite intimate contact and unfavorable social surroundings. This points strongly to the existence of a constitutional hereditary factor. But hereditary and acquired characteristics have to be distinguished. There seems to be no doubt that a predisposition for tuberculosis of a genotypic nature exists, although its special characteristics are unknown. The hereditary and constitutional factors are influenced by the environment. It is very difficult to differentiate what is the product of heredity and what is due to the environment. But it is sure that these qualities are not constant in intensity in all periods of life. They are influenced by somatic and functional factors, especially endocrine. The study of tuberculosis in twins is the method of choice to recognize the pathogenic influence of the hereditary factor. This method also differentiates between the genetic factor and the influence of the surroundings; 286 pairs of twins with tuberculous infection in one or both twins, were studied. Of those, 228 pairs had a proved infection with tuberculosis but, without previously observed or actual morbidity, the remaining 58 pairs had a manifestation of tuberculous affection The concordance of the infectious process, of the X-ray findings of the clinical manifestations, of the localization and of the course of the disease were studied in all those twins. The findings are classified as concordant, concordant-discordant, discordant-concordant and discordant. The same classification was used for

the surroundings. There were 277 males and 295 females amongst these twins. The age was from under one to 54 years. Most of them were between the ages of 5 to 14 (196 pairs). One hundred and one pairs (35.3 per cent) were identical and 185 pairs (64.6 per cent) were dizygotic twins. One observation was of triplets (two monozygotic and one heterozygotic). The surroundings were concordant in 274 pairs (96.1 per cent) and discordant in 11 (3.8 per cent). Of the 228 pairs who were simply infected, 81 (35.5 per cent) were monozygotic and 147 (64.4 per cent) were dizygotic. In 99 pairs (43.4 per cent) a positive tuberculin reaction was found in both twins and in 129 pairs (56.5 per cent) the reaction was positive in one and negative in the other twin. In the 129 pairs with discordant allergy, it was found that the surroundings were concordant in 107 cases (82.9 per cent) and concordant-discordant in the remainder (17.0 per cent). The X-ray findings were negative for tuberculosis in both twins of 201 pairs (88.1 per cent). Residual tuberculous lesions were found in both twins of 17 pairs (7.4 per cent). Only one twin of 10 pairs (4.3 per cent) showed residual lesions. Amongst the 81 monozygotic pairs, it was found that the allergic reaction was concordant in 36 pairs (44.4 per cent) and discordant in 45 pairs (55.5 per cent). Amongst the 147 dizygotic pairs, the allergic reaction was concordant in 63 pairs (42.8 per cent) and discordant in 84 pairs (57.1 per cent). There was, then, practically no difference between the two types of twins in those simply infected with tuberculosis. A completely changed picture was obtained amongst those twins who had manifestations of tuberculosis. Of those 58 pairs, 20 (34.4 per cent) were identical and 38 (65.5 per cent) were nonidentical twins. Of the latter 22 pairs were of the same and 16 of different sex. There were 34 male and 82 females in this group. Surroundings were concordant in 16 pairs, concordant-discordant in 34 pairs, discordant-concordant in 7 and unknown in one pair; 20 pairs had a history of tuberculosis in the family and 22 pairs were exposed to contact. Bacillary infection was concordant in 52 pairs (89.6 per cent) and discordant in 6 pairs (10.3 per cent) with practically no difference between the monozygotic and dizygotic twins. The clinical and roentgenological examination showed a concordance of the affection in 13 pairs (65 per cent) of the monozygotic and in only 5 pairs (13.1 per cent) of the dizygotic twins. The relation between the identical and the nonidentical twins as to concordance of the affection was therefore 5 to 1. Nine pairs of monozygotic twins showed the same pulmonary localization and 2 pairs the same extrapulmonary localization. One pair had no X-ray evidence and in one pair one twin had a pulmonary and one twin had extrapulmonary manifestation of the disease. Amongst dizygotic twins, only 4 pairs had concordant X-ray pictures and one pair showed a normal X-ray picture. All others had discordant findings. The beginning of the disease amonst the identical twins happened within one year in ten of 13 pairs. The evolution of the disease was similar in 10 pairs (55.5 per cent) and dissimilar in 3 (16.6 per cent). In the remaining 5 pairs (27.7 per cent) only one twin was affected. In the nonidentical twins, the beginning of the disease was similar in 2 of the 5 affected pairs. The evolution of the process was concordant in 6 pairs (17.6 per cent) and discordant in one pair (2.9 per cent). In the other 27 pairs (79.4 per cent) only one of the twins remained affected. Concordant affection proved by clinical and roentgenological examination was found in 65 per cent of the monozygotic and in only 13.1 per cent of the dizygotic twins. All this proves that the genotype does not have any appreciable influence on the acquisition of the bacillary infection. All human beings present about the same terrain for the infection. On the other hand, the course of the primary infection depends on the constitution of the individual. The authors have made surprising observations as to the analogy of appearance, localization and course of the disease among the monozygotic twins. For example, a pair of 7 year old twins which had no known contact, had

an hemoptysis the same day with hematogenous dissemination. In another observation, a pair of twins was brought up in different homes and did not know each other but presented, at the age of 6, exactly the same lesions of multiple tuberculous osteitis. In another pair, the same process appeared at the age of 18 and ended in death within one month from each other under the same circumstances. All that demonstrates the influence of the genetic factor in the development of tuberculosis. It is not sure if this factor acts directly on the germ and the lesions caused by it or on the specific defences which the infection causes in the body. Several observations suggest that the genetic factor also has an influence on the localization of the process. The authors point out that their investigations seem to prove the existence of an hereditary disposition of resistance towards the development and evolution of tuberculosis. This factor does not intervene in the acquisition of the tuberculous infection. —*El factor genetico en la patogenia de la tuberculosis: Su estudio en 286 pares de gemelos, R. F. Vaccarezza & J. Dutrey, An. Cáted. de pat. y clin. tuberc., December, 1944, 6: 181.*—(*W. Swienty*)

Minimal Tuberculosis.—In mass X-ray surveys "the films of thousands of persons have shown lesions characteristic of early tuberculosis." But a final diagnosis should not be made on X-ray evidence alone. Bacteriological studies are necessary to confirm the diagnosis. "If, after such diligent search, no tubercle bacilli are found, the diagnosis should be limited to 'suspicious tuberculosis'" ...and "we should refer to such persons as 'suspects' until such time as tubercle bacilli can be demonstrated." Careful clinical study is necessary, both for activity and differential diagnostic possibilities. "The same criteria used in diagnosis must be even more rigidly applied in the treatment of tuberculosis. . ." "A 6-week period of follow-up. . . .will determine the presence or absence of tubercle bacilli"..... "Such a practice will keep expensive sanatorium beds free for patients who are truly ill. . . ." "Persons who have tuberculosis. . . . cannot be greatly harmed by short delay of treatment". . . . "There is yet no evidence in medical literature that the minimal lesion case with negative sputum, negative gastric lavage, or no sputum is benefited by sanatorium care."—*Editorial: What Is Early Tuberculosis?, H. E. Hilleboe, Pub. Health Rep., September 6, 1946, 61: 1295.*—(*M. Pinner*)

Incipient Pulmonary Tuberculosis.—Guided by the realization that neither the extension nor the roentgenological appearance of pulmonary lesions discovered in a survey, are characteristic for true incipient lesions, epidemiological studies were conducted on a group of 2,033 persons found normal on a first survey. These subjects were studied with tuberculin tests and yearly X-ray films over a period of six years from 1939 to 1945. There were 261 women and 1,772 males; 240 of the former and 1,679 of the latter reacted positively to tuberculin tests. On the successive yearly examinations 54 (2.65 per cent) new lesions were discovered: 20 on the second examination, 8 on the third, 9 on the fourth, and 17 on the fifth examination. At the end of the period of observation, out of 93 males with negative tuberculin test at the beginning, 86 showed a positive tuberculin reaction. Active lesions appeared in 6.9 per cent of the subjects whose tuberculin reaction turned positive. The coincidence of the appearance of new lesions with the appearance of an allergic reaction permitted a comparison between primary and postprimary lesions. The postprimary lesions are most frequently represented by infiltrations in the first two intercostal spaces. It is not always possible to distinguish primary lesions from those appearing in already infected persons. Therefore, the primary nature of a lesion can be established only by simultaneous appearance of a positive tuberculin reaction in a formerly tuberculin-negative individual. Twenty-eight of the newly diagnosed cases could be considered as cured during the period of observation. In 5 cases progression of the

lesions was noted; 5 cases remained stationary. In 9 cases the activity of the lesions could not be determined. Five patients died and 3 cases were lost sight of. Three of the 5 deaths occurred in patients with primary tuberculosis, the total number of this type of lesion being 9, while only 2 deaths occurred in the group of 45 patients with a reinfection type of lesion. It is evident that primary tuberculosis in the age broup between 15 and 25 is not as benign as it is conventional to consider it. In 48 per cent of the patients there was a source of infection in the household. Although the intensive educational campaign associated with the survey has increased the attendance at the clinic, there was little coöperation on the part of the newly diagnosed cases. Only few of them have accepted the appropriate therapeutic suggestions. The standardization of the therapeutic indications and the extension of social security measures are advocated.—*Lesiones iniciales de la tuberculosis pulmonar del adulto, P. Purriel & A. A. Piaggio, Hoja tisiol., December, 1945, 5: 398.*—(*L. Molnar*)

Symptoms in Tuberculosis.—A review of 650 cases of tuberculosis discovered accidentally during the course of surveys of 250,000 air force personnel showed that 36 per cent of the patients had minimal disease, 38 per cent had moderately advanced disease and in 26 per cent the disease was far advanced. No sputum was available for study in 18 per cent (including 9 cases showing radiological evidence of excavation), 27 per cent had positive sputum on smear and 55 per cent had negative sputum on smear. Concentration and cultures were not done. Thirty-eight per cent of the patients denied all symptoms on direct questioning. Cough was by far the most frequent symptom. It was present in 54 per cent of all cases. Dyspnea on exertion was present in 11 per cent, lassitude in 7 per cent, loss of weight in 6 per cent. Digestive disturbances were admitted by 3 per cent, and chest pain by 4 per cent. Night-sweats were present in 2 per cent, and hoarseness in 0.3 per cent. The blood sedimentation rate was normal in 37 per cent of the cases, moderately elevated in 24 per cent and considerably elevated in the remainder. This series includes only cases which were judged active after thorough study of the clinical, radiological, and laboratory material.—*Symptoms of Early Pulmonary Tuberculosis, H. J. Trenchard, Lancet, December 29, 1945, 26: 842.*—(*H. Marcus*)